

## ESTIMATION OF EXPECTED DURATION OF STAY OF TOURISTS IN THE CULTURAL AND RELIGIOUS CAPITAL OF INDIA

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### ABSTRACT

*Since the ancient times Varanasi has been the capital of religion and culture of North India which always attracts tourists from abroad as well as from different parts of India. For every tourist, she offers a different experience. There is a natural tendency that a tourist came to visit various places in the Varanasi city and never really returns to their own place or country as they may extend their stay as per their own conditions or situations. This paper deals with a probability model for the number of tourists according to the length of their stay under certain assumptions. The parameters involved in this model have been estimated by the maximum likelihood (ML). This model has been applied to the real data set collected from various hotels in Varanasi. Each hotel from these regions is supposed to be a unit or cluster on the basis of number of tourists staying in that hotel which defines the size of a hotel. So, we have divided hotels into different clusters having an unequal size. Further, 10 clusters of unequal size were randomly selected in which 4 large clusters and 6 small clusters. Then all the tourists of the selected clusters were enumerated and the retrospective data was collected from hotels about the duration of stay of the tourists in the Varanasi district on a day during February, 2014. The total sample size is 386 and tourist's information about their stay is analyzed. The international tourists mainly belong from USA, UK, France, Australia, Italy, Netherlands, Japan, China, South Korea etc., however majority of domestic tourist are from Tamil Nadu, Maharashtra, Kerala, Andhra Pradesh and Rajasthan. The mean duration of stay of international tourists is found less than the domestic tourists' stay.*

**KEYWORDS:** International Tourists, Domestic Tourists, Probability Model, Cluster, Length of Stay & Indian Tourism Demand

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### INTRODUCTION

India is a country with diversified culture and traditions. The natural beauty of India, festivals, dresses, heritage sites are very popular among tourists. In India people believe in 'Atithi Devo Bhava' i.e. an inbound tourist is in a greater sense of being welcomed to the country. Tourism in India is the largest service industry, with a contribution of 9.4% to the national GDP, 6.3% of total investment and 8.0% to the total employment in 2017. India is a country known for its lavish treatment to all visitors, no matter where they come from. Its visitor-friendly traditions, varied life styles and cultural heritage and colorful fairs and festivals held abiding attractions for the tourists. The other attractions include beautiful beaches, forests and wild life and landscapes for eco-tourism; snow, river and mountain peaks for adventure tourism; technological parks and science museums for science tourism; centers of pilgrimage for spiritual tourism; heritage, trains and hotels for heritage tourism. Yoga, Ayurveda and natural health resorts and hill stations also attract tourists. The notion of tourism includes movements of people across the frontier or within their own country and is composed of three elements, namely man, space and time.

Thus, the most popularly used categorization remains domestic and international tourism. In Domestic tourism people travel outside their residing area but within their own country for leisure, business, pilgrimage and adventure etc. while International tourism refers to movement of people between different countries. India has fascinated people from all over the world for its rich culture and heritage. There are historical monuments, beaches, places of religious interests, hill resorts etc. that attract tourists. Every region is unique with its handicrafts, fairs, folk dances, music and its people. India is a land of diversities, with a wide variety of tourism offerings, varied geographies and sub-cultures.

Tourism has emerged as one of the world's largest service industries with adequate economic benefits and immense opportunities. With the emergence of technological advancement, and competitiveness in service-based industries the tourism sector is playing a vital role in contributing to improve gross domestic product (GDP) and creation of employment across the world economy. This accelerating tourism industry has proved to be one of the important drivers of growth and prosperity, employment generation, raised national income and improved balance of payments in the Indian economy. Indian tourism sector is one of the most vibrating sectors of the economy. Sensing the importance and significance of this sector, Indian Government has invested much for the development of tourism. It has been partially successful with increase in foreign tourist arrivals over the last decade, consideration by "Incredible India Campaign". Tourism is a demand driven, service oriented industry, experiencing rapid growth and innovation and plays a key role in the growth of the country's economy. The tourism industry, which benefits the transportation, accommodation, catering, entertainment and retailing sectors, has been blooming in the past few decades.

Furthermore, international tourists increasingly require interesting destinations in their pursuit of relaxation, escape, and adventure than in the preceding century. Recognizing the opportunity to earn valuable foreign currency, developing countries have catered to these desires by encouraging tourism development. Tourism is a major engine of economic growth in most parts of the world. Several countries have transformed their economies using the tourism potential to the fullest. Tourism has great capacity to create large scale employment especially to the unskilled (India tourism, Annual Report, 2001-02). Recently in India international tourism industry is expanding because the number of international tourists arrivals to India are increasing every year, which positively affects Indian economy. For a long time, economists have tried to understand the international tourists' consumer behavior through demand models. Barry & O'Hagan (1972) studied the demand of British tourists going to Ireland; Jud & Joseph (1974) studied the demand of international tourists going to Latin American, Uysal & Crompton (1984) studied the demand of international tourists going to Turkey. Also Kulendran (1996) and Lim & McAleer (2000) studied the demand of international tourists going to Australia; Durbarry (2002) studied the demand of French tourists going to the UK, Spain & Italy. Chaiboonsri & Prasert (2012) studied the model of international tourism demand in Thailand. Menezes et al. (2010) have already studied about tourism demand for length of stay on the Azores, the fastest growing tourist place in Portugal. The above mentioned studies are based on Count Data Regression Model.

Length of stay is an important determinant, for instance, of the tourist's overall expenditure and consumption of local resources, as the number of possible experiences to be undertaken by tourists depends on their length of stay (Davies & Mangan, 1992; Legohérel, 1998; Saarinen, 2006). Uncovering the determinants of length of stay is critical to the design of marketing policies that promote longer stays, associated with higher occupancy rates and revenue streams. Length of stay is one of the questions resolved by tourists when planning or while taking their trips (Decrop & Snelders, 2004). Hence, length of stay is best recorded when tourists depart, and, quite likely, is influenced by tourists' socio-demographic

profiles. This paper contributes to fill this gap by developing a probability model for length of stay of the tourists at a particular place of interest. In this study an attempt has been made to model the duration of stay of tourists in Varanasi, the heritage city of India, which has not been undertaken so far. This study is based on the duration of stay of the international/domestic tourists coming to Varanasi, India during February 2014.

## DATA AND METHODOLOGY

The present study provides information of selected international tourist arrivals to India mainly from the countries like USA, UK, France, Australia, Italy, Netherlands, Japan, China, South Korea etc., however majority of domestic tourists are from Tamil Nadu, Maharashtra, Kerala, Andhra Pradesh and Rajasthan. Primary data have been collected from international and domestic tourist arrivals to Varanasi, India by a method of survey. Survey of 386 international/domestic tourist arrivals is considered in this study. Each hotel is supposed to be a cluster on the basis of number of tourists staying in that hotel which defines the size of a hotel. Further, we were randomly selected 10 clusters of unequal size in which 4 large clusters and 6 small clusters. Then all the tourists of the selected clusters were enumerated and the retrospective data has been collected from hotels about the duration of stay of tourists in the Varanasi district on a day in February, 2014. The total sample size is 386 and tourist's information about their stay is analyzed.

Singh et al. (2015) proposed a one and two parameter exponential distribution for modeling the length of tourist's stay in Varanasi and found the two parameter exponential distribution is more suitable to explain the length of stay of tourists than exponential distribution with one parameter. In this paper the researcher has tried to use a more flexible distribution known as Gama distribution to explain the length of stay of the tourist because Gama distribution captures more variability.

### Model

The chance of return to the own place of residence also increases with the increase in duration of stay, Thus, it is assumed that the number of tourists according to the duration of stay follows Gamma distribution which provide an idea to use any distribution with an increasing hazard.

i.e.  $X_1, X_2, X_3, \dots \sim \text{Gamma}(\alpha, \beta)$

The probability density function of random variable  $X$  is

$$f(x) = \frac{x^{\alpha-1}}{\beta^\alpha \Gamma(\alpha)} e^{(-x/\beta)}; \quad 0 < x < \infty, \alpha > 0, \beta > 0 \quad (1)$$

Here  $\alpha$  and  $\beta$  are the two parameters of the distribution. Then, the proportion of tourists with the duration of stay is less than or equal to  $X$  is

$$F(x) = \begin{cases} \frac{1}{\alpha} \int_0^x t^{\alpha-1} e^{(-t/\beta)} dt; & x > 0 \\ 0, & \text{otherwise} \end{cases} \quad \text{or} \quad \begin{cases} \frac{\Gamma_{x/\beta}(\alpha)}{\Gamma(\alpha)}; & x > 0 \\ 0, & \text{otherwise} \end{cases} \quad (2)$$

### Estimation of Parameters in the Model

If  $X_1, X_2, X_3, \dots$  are i.i.d. Gamma ( $\alpha, \beta$ ) then the likelihood

$$L(x; \beta, \alpha) = f_n(x; \beta, \alpha) = \frac{1}{\beta^{n\alpha} (\Gamma(\alpha))^n} \left( \prod_{i=1}^n x_i \right)^{\alpha-1} \exp \left( -\sum_{i=1}^n \frac{x_i}{\beta} \right) \quad (3)$$

Taking the log, the following is obtained:

$$l(x; \beta, \alpha) = -n \log(\Gamma(\alpha)) - n\alpha \log \beta + (\alpha - 1) \sum_{i=1}^n \log x_i - \frac{1}{\beta} \left( \sum_{i=1}^n x_i \right) \quad (4)$$

Taking the derivative of the log, the likelihood with respect to  $\beta$  and setting it equal to 0:

$$\frac{\partial l}{\partial \beta} = -\frac{n\alpha}{\beta} + \frac{1}{\beta^2} \sum_{i=1}^n x_i = 0 \quad (5)$$

Solving for  $\beta$ , we obtain the following MLE for  $\beta$ :

$$\hat{\beta} = \frac{1}{\alpha n} \sum_{i=1}^n x_i = \frac{\bar{x}}{\alpha} \quad (6)$$

Substituting this back into the log likelihood function, taking its derivative with respect to  $\alpha$ , and setting the result equal to 0:

$$\frac{\partial l}{\partial \alpha} = -\frac{n\Gamma'(\alpha)}{\Gamma(\alpha)} - n \log \left( \frac{\bar{x}}{\alpha} \right) + \sum_{i=1}^n \log x_i = 0 \quad (7)$$

$$\frac{\partial l}{\partial \alpha} = -\frac{n\Gamma'(\alpha)}{\Gamma(\alpha)} + n \log(\alpha) - n \log(\bar{x}) + \sum_{i=1}^n \log x_i = 0 \quad (8)$$

Solving for  $\alpha$  as far as it could be done (the answer remains in terms of the digamma function), the following condition for the MLE of  $\alpha$  is obtained:

$$\log(\alpha) - \frac{\Gamma'(\alpha)}{\Gamma(\alpha)} - \log(\bar{x}) + \frac{1}{n} \sum_{i=1}^n \log x_i = 0 \quad (9)$$

The above function can be solved using an iteration procedure therefore  $\beta$  can be estimated.

### RESULTS AND CONCLUSIONS

Table 1 shows the distribution of tourists' arrival in India and Varanasi city from 2003 to 2017. The percent share of foreign tourists in Varanasi is increasing with time. Also domestic tourists are increasing in an impressive way. It means Varanasi which is a traditional, cultural and religious city attracts tourists fantastically through the exceptionally high quality hospitality and better environment. The mean duration of stay of the tourists in Varanasi is observed 4.92 days and

standard deviation is 3.51 days. The minimum stay of the tourists is 1 day, however maximum stay is 21 days. The mean duration of stay of international tourists is found (3.76 days) less than the domestic tourists' stay (5.32 days). Some foreigners who love Indian mythology, culture and values, stay up to 2 or 3 weeks. Table 2 shows the length of stay of the tourists in Varanasi in case of two parameter exponential distribution, Singh et al. (2015). Table 3 shows that the two parameter Gamma distribution excellently explains the length of stay of the tourists in Varanasi over the previous model. The estimated mean is 4.17 days and standard deviation of length of stay is 3.17, which is close to the actual values. The value of  $\chi^2$  and p-value indicates that the proposed model i.e. Gamma distribution is more suitable than the two parameter exponential distribution in this situation. Further research work is needed in an empirical study to find the important factors and main attractions which affect the length of stay of international/domestic tourists.

From the table 1, it has been seen that India was always increasing the foreign tourist arrival each year but due to some reasons it is increasing slower till 2013 i.e. before introducing the visa-on-arrival. So it could be said that one of the vital factors that is affecting the number of foreign tourist is complicated visa process in India, before visa on arrival was introduced. As the scheme conceptualized during UPA government's time, it was launched on November, 2014 to cater to the nationals of 44 countries at nine airports (Delhi, Mumbai, Goa, Bengaluru, Chennai, Kolkata, Kochi, Hyderabad, Thiruvananthapuram) to facilitate short duration stay of International travellers. Since the launch of the scheme on November, 2014, a total 1, 10,000 visas have been issued by the Government under the scheme. During December, 2014, a total of 14083 Visas-on-arrival (TVoA) were issued as compared to 2700 during December, 2013, registering a growth of 421.6 percent. This is a great augmentation which was observed.

From the Table 2 & 3, it can be seen that the exponential model explains the distribution of length of stay in terms of parameter while the Gamma model doesn't explain it. On the other hand Gamma model is used for regression analysis while the two parameter exponential model cannot be used.

The  $p$ -value is the level of marginal significance within a statistical hypothesis test representing the probability of occurrence of a given event. This is used in the above table as an alternative to rejection points to provide the smallest level of significance at which the null hypothesis would be rejected and the calculated  $\chi^2$  value in case of Exponential distribution with two parameter is 9.1 and 4.81 in case of Gamma distribution. This shows that both the distribution fitted the data, but in Gamma distribution value of  $\chi^2$  is less than in case of Exponential distribution so it could be understood that Gamma distribution is better fitted for the data.

**Table 1: Distribution of Tourist's Arrival in India and Varanasi**

S. No.	Year	Cross Border Tourists in India	Tourists in Varanasi			
			Cross Border Tourists		Domestic Tourists	Total
			Number	Percent Share of India		
1	2003	2726214	108017	3.96	2701716	2809733
2	2004	3457477	141328	4.09	2809422	2950750
3	2005	3918610	143993	3.68	3049980	3193973
4	2006	4447167	153099	3.45	3204244	3357343
5	2007	5081504	169964	3.35	3506991	3676955
6	2008	5282603	178396	3.38	3713809	3892205
7	2009	5167699	188853	3.65	3898557	4087410
8	2010	5775692	219088	3.79	4139785	4358873

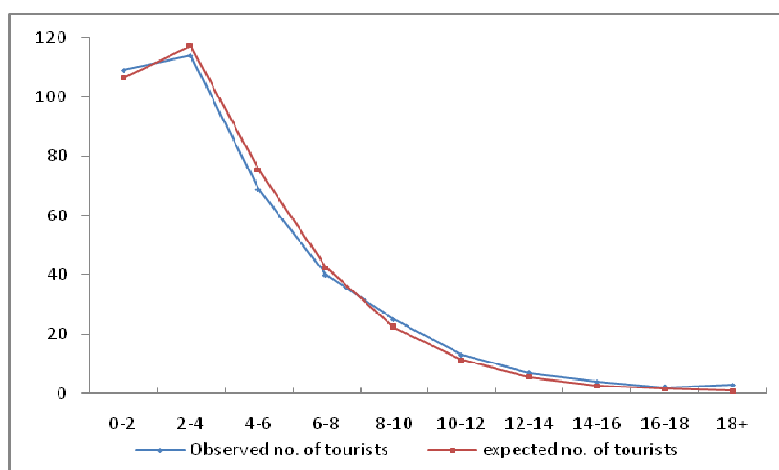
Table 1: Contd.,						
9	2011	6309222	245660	3.89	4466972	4712632
10	2012	6648318	278573	4.19	4783012	5061585
11	2013	6967601	285252	4.09	4966161	5251413
12	2014	7679099	287761	3.74	5202236	5489997
13	2015	8027133	302370	3.77	5413927	5716297
14	2016	8804411	312519	3.55	5600146	5912665
15	2017	10177899	334708	3.29	5947355	6282063

**Table 2: Distribution of Number of Tourists in Case of Exponential Distribution According to Duration of Stay in Varanasi**

Duration of Stay (in days)	Two Parameter Exponential Distribution	
	Observed Frequency	Expected Frequency
< 2	109	86.87
2-4	114	119.49
4-6	69	71.76
6-8	40	43.09
8-10	25	25.88
10-12	13	15.54
12-14	7	9.33
14 – 16	4	5.61
16 – 18	2	3.37
≥18	3	5.06
Total	386	386
Value of parameters		$\lambda=0.255$ & $\theta=1$
$\chi^2=9.1$ df=7		
p-value=0.25		

**Table 3: Distribution of Number of Tourists in Case of Gamma Distribution According to Duration of Stay in Varanasi**

Duration of Stay (in Days)	Observed Frequency	Expected Frequency
<2	109	106.52
2 – 4	114	117.34
4 – 6	69	75.56
6 – 8	40	42.39
8 – 10	25	22.27
10 – 12	13	11.26
12 – 14	7	5.55
14 – 16	4	2.69
16 – 18	2	1.57
≥18	3	0.85
Total	386	386.00
The value of parameters		$\alpha = 1.7343$ $\beta = 2.4049$
$\chi^2=4.81$ , df=5		
p-value=0.44		



**Figure 1: Diagram Showing the Distribution of Observed and Expected Duration of Tourists Stay in Varanasi**

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